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No. XII.

ORIGINAL SCREW.

The SILVER VULCAN MEDAL *and* TEN GUINEAS *were this session presented to Mr. G.* WALSH *of Mount-street, Walworth Common, for* AN ORIGINAL SCREW. *The screw and other parts of apparatus mentioned in the following description have been placed in the Society's repository.*

THE Society have for some few years offered a premium for a method for generating an original screw more perfect than any hitherto known. Several claimants have come forward; but the Society have not as yet thought themselves justified in awarding the premium, on account of the actual imperfections of the screws produced, and the inadequacy of the means employed to obtain a correct result. The screw made by Mr. Welsh, when examined by a micrometer, appears to be erroneous to the amount of no more than 1-250 of an inch in thirty-four threads; and, therefore, though not fit for astronomical purposes may however be very advantageously applied to other uses. The ingenious simplicity of the apparatus by which it was made, not requiring the use of a screw engine with guide screw, wheel work, slide rest, &c. is also a circumstance worthy of notice, as offering to the artisan of adequate skill but contracted pecuniary means facilities of good work which hitherto have not been in his power.

In plate XI., fig. 1, *a a* represents a cylinder of softened steel, which is to be cut into a screw.

The first step is to turn a short cylinder of soft steel exactly twice the diameter of the intended screw. This is then to be fitted on an arbor in the lathe, and, by means of a common screw-tool of the required number of teeth, is to be cut into a double threaded screw, and is then to be hardened: of this latter screw, *b b* fig. 2 represents a lateral and a front view.

Another short cylinder of soft steel is then to be made of exactly the diameter of the intended screw; it is then to be fitted on a pin and put into the frame *d d* fig. 1; in this situation it is to be pressed hard against the cylinder *b*, fig. 2, while revolving in the lathe, until a good thread is raised on its surface. The thread thus formed will be a single thread, though taken from a double one, because during the process it revolves in proportion to the larger cylinder as two to one; it will also be a left-handed thread, because taken by impression from a right-handed one. After a few revolutions of the cylinder *c*, the frame in which it is held is to be turned upside down and the same number of revolutions are to be made with the frame in this position, by which alternation the thread will be kept quite perpendicular to its axis, and the more the two cylinders are worked together, the more will the cylinder *c* be free from the errors of the first cylinder *b*. Being completed, it is then to be hardened, and is again to be put into the frame *d d*. The cylinder *a a* being put into a lathe, the screw *c c* is to be pressed hard against it in the manner of a milling tool, beginning on the right hand: when it has made a sufficient impression or lead, it is to be shifted one thread towards the left hand, the following threads of the screw always working in the preceding impression which serves as their guide; this is to be continued till the whole cylinder is impressed with the lead of a screw, (as shown fig. 1.) which will of course be right-handed, because the impressing screw is left-handed. The lead thus obtained is to be eased or cut deeper by the pointed tool *e e,* and is then to be finished by the screw *c,* taking care, as before directed, to reverse the frame *d d* from time to time.

To make a left-handed screw to suit a given right-handed one, tap a cylinder of steel in the same dies, and of the same diameter as the given screw, and turn each end down to a pivot, as *f f,* fig. 4, and harden it; drop it in the open frame *g g*, fig. 5, (fig. 6 is an end view of the same), and work it hard against the prepared cylinder exactly as described above for the original screw, by which a left-handed lead will be obtained, which is to be deepened with the point tool and finished by the roller *f f* as before.

When this screw is obtained it may be hardened, and left-handed dies may be made from it.